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TORDON 212 INEFFECTIVE IN KILLING FIRETREE IN HAWAII

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Abstract: Firetree *(Myrica faya),* an aggressive plant pest without any commercial value, has infested thousands of acres of forest and range lands in Hawaii. Methods of controlling it must be found if these lands are to be planted to more desirable species. In a study on the island of Hawaii, various combinations of Tordon 212 herbicide, injected into knotches cut at intervals around a tree, and month of treatment were tried. None of the combinations tested was effective in controlling firetree.

Oxford: (969):441–414.26 Tordon 212:176.1 *Myrica faya.*
Retrieval Terms: Myrica faya; Hawaii; weed control; herbicide trials; Tordon 212.

Firetree *(Myrica faya),* an aggressive plant pest in Hawaii and without any commercial value, can be killed by injections of Tordon 22K herbicide.[1] From an earlier study, Walters and Null[2] reported that 100 percent crown kill and 99 percent control of stem sprouting were obtained by applying this herbicide. Small unmeasured amounts of undiluted Tordon 22K were injected into notches that were cut at about 5-inch intervals around the tree. All injections were made in May.

In a follow-up study to refine field techniques, I tried various combinations of herbicide concentration, notch interval, and treatment month to see which would be the most effective in killing firetree. Because Tordon 22K was not commercially available, Tordon 212 was tested.

The study showed that none of the Tordon 212 treatments tested resulted in large numbers of dead firetrees. Treatment effect varied with herbicide concentration and notch interval, but not with month of treatment. As the herbicide dilution and notch spacing were increased, treatment became less effective.

METHODS

The study was done on Kukaiau Ranch lands on the slopes of Mauna Kea, at 3,500 feet elevation. Annual rainfall averages about 70 inches. The soil is Maile silty clay loam. Aspect is northeast, and slopes average about 10 percent. Firetrees averaged about 20 feet tall and ranged from about 16 to 25 feet tall. Their basal diameters averaged about 10 inches and ranged from 7 to 16 inches. About 75 percent of the trees were forked at the base. Basal sprouts were common, with an average of about six sprouts per tree. The firetrees on the area are typical in size, vigor, and density of the firetree that the Hawaii Department of Agriculture is assigned to eradicate.

Six randomized blocks, each consisting of 28 firetrees, were established. The 28 trees in each replication were randomly placed into four groups of seven trees each; each group representing a different treatment month–January, April, July, and October. The herbicide concentrations tested were 100, 66, and 33 percent of full strength. Each concentration was diluted with water. Notches were made at either 5- or 8-inch intervals. The six concentration spacing treatments and the control (no notches or herbicide) were randomly assigned to the seven trees in each group.

The base of each tree was knotched at prescribed intervals by marking with a diameter tape and chalk and then cutting with a 2-inch wide blade hatchet. One milliliter of herbicide was injected into each freshly cut notch by using a syringe.

During the April phase, a moderately heavy rain began to fall after trees in three of the six blocks were treated. Because stemflow might have washed the herbicide from the notches, new trees in those three blocks, and trees in the other three blocks were treated a week later.

Effect of treatment was rated on a four-point scale: (0)–the tree apparently unaffected; (1)–affected but able to survive; (2)–affected and dying; (3)–dead. Effectiveness was rated at 3-month intervals for 1 year and then again 2 years after the last treatment.

RESULTS AND DISCUSSION

None of the treatments tested was effective. Two years after treatment, even the trees given the strongest treatment–100 percent concentration and notching at 5-inch intervals–had an average of only 58 percent that were dead or dying. Only four of the 168 treated trees were dead; three of the four dead trees received the full-strength treatments.

Treatment effectiveness varied with herbicide concentration and generally with notch interval, but not with treatment month *(table 1)*. As herbicide dilution or notch interval increased, treatment effectiveness decreased. Treatment effectiveness also varied on different stems of multiple-stemmed trees. Some stems were killed, while others were only slightly affected or unaffected. Why these anomalies occurred is not known, as the herbicide injected into the base of multiple-stemmed trees should have affected all stems. Treated multiple-stemmed trees with one or more unaffected stems were rated as able to survive. Unaffected stems continued to bear fruit and thus remained sources for the spread of firetree.

Other observations of treatment effects are of interest. For every treatment and month, 90 to 95 percent of the total herbicide effect became apparent within 3 months. At 3 months, some trees were almost dead, others were only slightly affected. Changes in tree condition after 3 months, however, were slow and slight for all treatments. This condition indicates that treated trees can be evaluated within 3 months after the initial treatment. Also, rain following treatment does not necessarily alter treatment effect. When one-half of trees in a plot were treated while it was raining, and the other half while it was dry, the effect of the herbicide was about the same.

Notch application of herbicide should have less effect on the environment than other methods of application because the chemical is tied up in the woody tissue. But in 14 cases, firetrees adjacent to treated trees showed similar herbicide toxicity symptoms as the treated trees. Adjacent trees were affected in each of the combinations tested. Affected adjacent trees were generally within 5 feet of the treated trees.

Tordon 22K was much more effective than

Table 1–*Dead and dying firetrees 2 years after treatment with Tordon 212, by treatment and month, Kukaiau Ranch, Hawaii*

Month	Herbicide concentration (percent)/notch interval (inches)						
	100/5	100/8	66/5	66/8	33/5	33/8	Control
	Percent						
January	50	67	33	0	0	0	0
April	83	67	33	17	0	0	0
July	50	67	50	17	17	0	0
October	50	50	33	33	17	0	0

Tordon 212 in killing firetree. The difference in results could be due to a number of factors: less Tordon 212 was applied per notch; Tordon is only one-half as concentrated in the 212 formulation as it is in 22K; and the difference in the type of salt involved, i.e., potassium (Tordon 22K) and triisopropanolamine (Tordon 212).

NOTES

[1]Trade names or commercial brands are mentioned solely for information. No endorsement by the U.S. Department of Agriculture is implied.

[2]Walters, Gerald A., and William S. Null. *Controlling firetree in Hawaii by injection of Tordon 22K.* USDA Forest Serv. Res. Note PSW-217. Pacific Southwest Forest and Range Exp. Stn., Berkeley, Calif. 3 p., illus. 1970.

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